

Application No. 10/633,893
Amendment dated September 18, 2006
Reply to Office Action of June 20, 2006

AMENDMENTS TO THE SPECIFICATION:

Please replace paragraph [0029] with the following amended paragraph:

[0029] Next, a glass substrate according to the present invention will be described. The main feature of a glass substrate according to the invention is that it is formed of a glass composition as described above. A glass substrate according to the invention may be produced by any conventionally known fabrication process, for example in the following manner. Raw materials of glass ingredients, i.e., oxides, carbonates, nitrates, hydroxides, and the like corresponding to the individual ingredients, are, in the desired proportions and in the form of powder, fully mixed to obtain a blending of the raw materials. This blending is then put, for example, in a platinum crucible placed inside an electric furnace heated to ~~1,300 to 1,550 °C~~ 1,300 to 1,550 °C, where the blending is first melted and clarified and then stirred and homogenized. The molten glass is then poured into a preheated mold, and is cooled slowly so as to be formed into a glass block. Next, the glass block is heated again to close to its glass transition point and is then cooled slowly so as to be straightened. The glass block thus obtained is then sliced into a disk, and is cut out using a core drill so as to have concentric outer and inner edges. Alternatively, the molten glass is formed into a disk by press molding. The disk-shaped glass material thus obtained is then formed into a glass substrate by subjecting the two flat surfaces of the glass material to coarse and fine polishing and then to cleaning using at least one of a water liquid, an acidic liquid, or an alkaline liquid.

Please replace paragraph [0038] with the following amended paragraph:

[0038] It is preferable that a glass substrate according to the invention, when melted and kept at ~~1-500 °C~~ 1,500 °C for 24 hours, exhibit a weight reduction factor lower than 8.0 %. A weight reduction factor of 8.0 % or higher leads to unstable properties and lower productivity.

Please replace paragraph [0039] with the following amended paragraph:

[0039] In a glass substrate according to the invention, it is preferable that the glass transition temperature T_g be 600 °C or lower, that, for satisfactory productivity in the melt molding step and out of other considerations, the liquid phase temperature T_L be ~~1-300 °C~~ 1,300 °C or lower, and that the temperature $T_{\log \eta = 2}$ at which the glass substrate has a melt viscosity of $\log \eta = 2$ be ~~1-550 °C~~ 1,550 °C or lower. The glass transition temperature, the liquid phase temperature, and $T_{\log \eta = 2}$ can be controlled within these ranges in the following manner. For example, the glass transition temperature is controlled by adjusting, so long as the desired main properties are not degraded, the total content and proportions of the skeletal ingredients SiO_2 , B_2O_3 , and Al_2O_3 and the content of alkali metal oxides, i.e., the ingredients that greatly reduce the glass transition temperature. The liquid phase temperature can be controlled by adjusting the total content and proportions of ingredients of which the addition in excess amounts makes the glass unstable. $T_{\log \eta = 2}$ can be controlled by adjusting, so long as the desired main properties are not degraded, the proportions in which SiO_2 , i.e., the main ingredient that increases the viscosity, and other ingredients that improve the viscosity are added.

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Please replace paragraph [0052] with the following amended paragraph:

[0052] For each of different glass compositions, which each correspond to one of Practical Examples 1 to 40 and Comparative Examples 1 to 5, prescribed amounts of glass ingredients in the form of powder were weighed and put in a platinum crucible, were mixed, and then were melted at ~~1-550°C~~1,550 °C in an electric furnace. When the ingredients were melted sufficiently, stirring blades were put into the molten glass to stir it for about one hour. Thereafter, the stirring blades were taken out, then the molten glass was allowed to stand for 30 minutes, and then it was poured into a mold so as to be formed into a glass block. The glass block was then heated again to close to its glass transition point, and was then cooled slowly so as to be straightened. The glass block thus obtained was then sliced into a disk about 1.5 mm thick and 2.5 inches across, and was cut out using a cutter so as to have concentric inner and outer edges. The two flat surfaces of this disk were subjected to coarse and fine polishing and then to cleaning to obtain a glass substrate of the corresponding Practical or Comparative Example. With each of the glass substrates thus produced, its various properties were evaluated.